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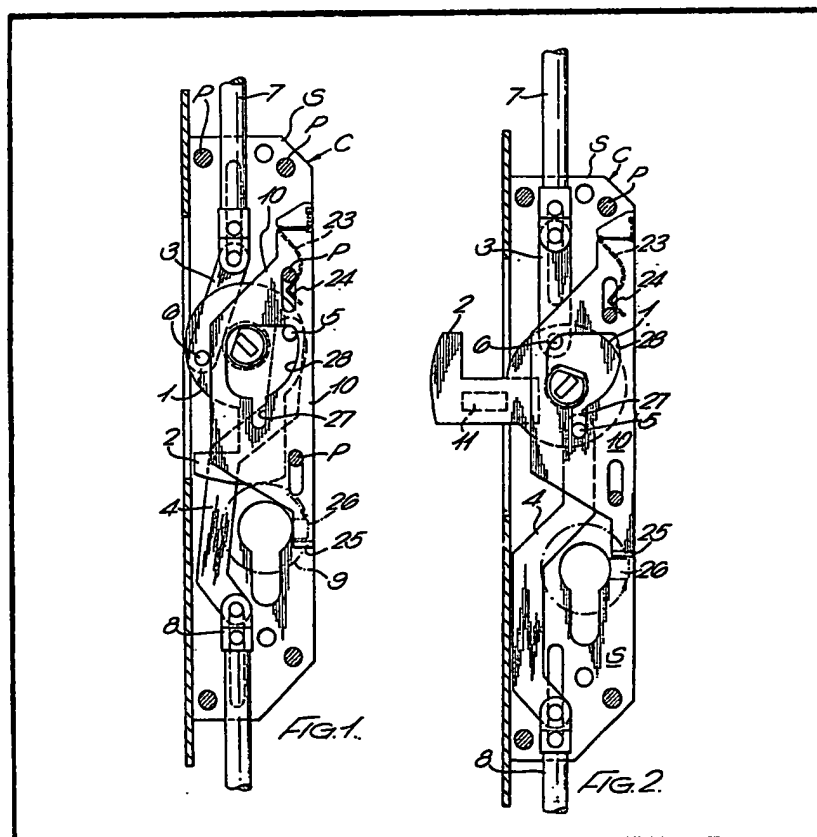
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(54) Lock

(57) A three point lock for sliding patio doors or the like wherein a rotary hub 1 is located in a slimline casing C and has a latch 2 connected thereto and head and sill bolts 7 and 8 pivotally connected thereto at 6 and 5 so that upon rotation of the hub 1 the latch 2 is rocked between unlocked and locking position and the bolts 7 and 8 are moved from unlocked to extended locking positions and vice versa. The latch is of the hook type.

The lock is deadlocked by means of a cylinder-operated locking slide 10 slidably mounted within the casing C for movement from an unlocked position to a deadlocked position in which a slot 27 therein engages with a pin 5 connecting one of the bolts 8 to the hub 1, thus preventing rotation of the hub 1. A spring 23 is provided to bias the locking slide 10 to its locking and unlocked positions.

The hook bolt 2 has a ceramic strip 11, resistant to hacksaw attack, embedded in the centre one of three steel laminates.

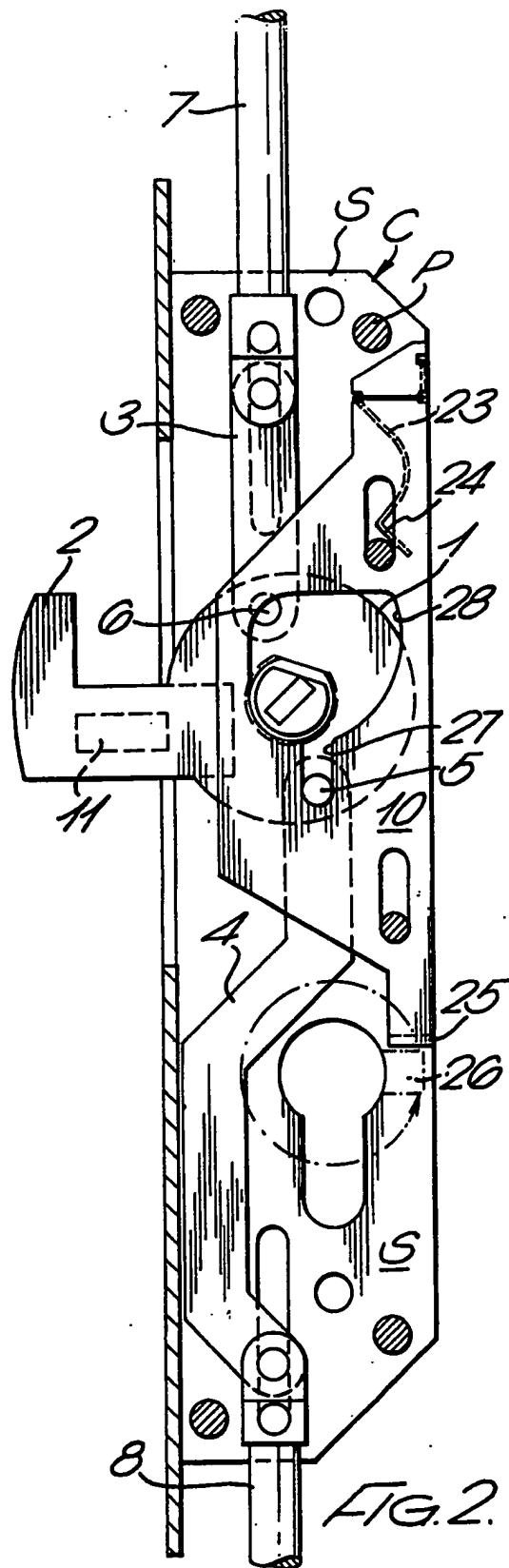
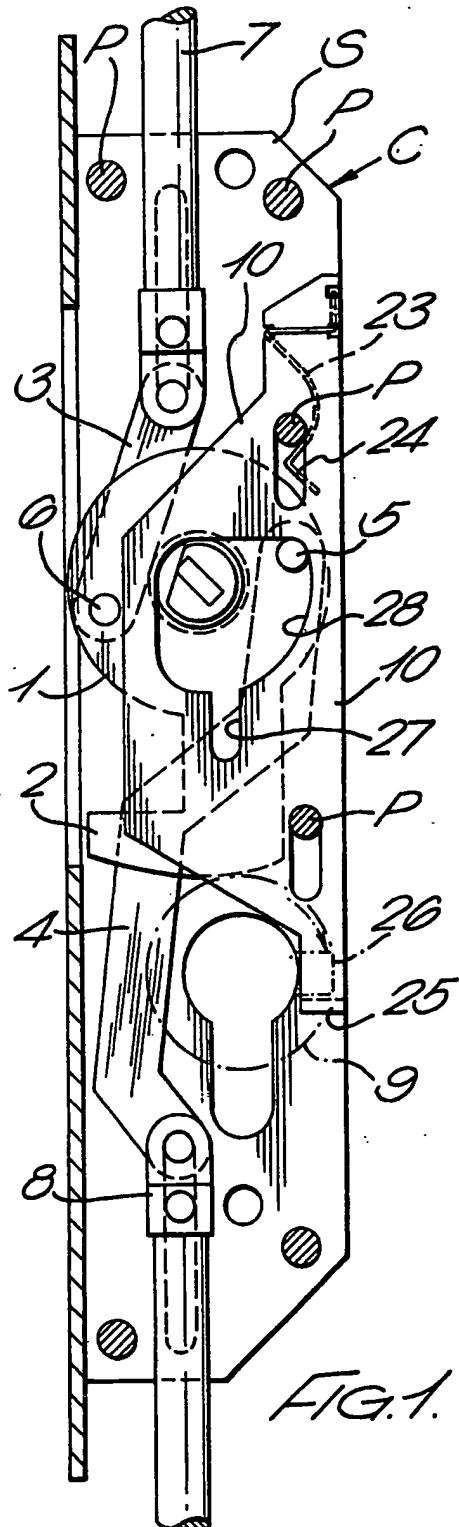


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The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

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SPECIFICATION Lock

This invention relates to a three point lock for sliding patio doors or windows (hereinafter referred to as sliding doors). By a three point lock, we mean a lock which, when operated, will cause the door to which it is fitted to be secured to its frame as three points. More specifically, the invention relates to a three point lock with a dead-locking facility.

Three point locks are known but the majority of these only have a single operating member, e.g. a handle, to move the lock between its locking and unlocked positions. This means that the locks cannot be deadlocked and most are not, therefore, suitable for use on outside sliding doors of private houses or on sliding shop front doors.

A three point lock has been proposed in U.K. Patent Specification No. 935062 in which the head and sill bolts are operated with the same actuator as the latch. In this construction the latch is slidably mounted in the casing and a locking slide is provided to deadlock the latch, head and sill bolts. This locking slide can be released by operating a release mechanism which may incorporate a key but the mechanism has many moving parts, and the lock release mechanism projects beyond the remainder of the lock mechanism, making it unsuitable for use with most sliding doors.

Another lockable three point lock is shown in U.K. Patent Specification No. 270053 but in this lock the locking mechanism is located to one side of the rest of the mechanism, which means that the whole mechanism occupies considerable space. This means it cannot be fitted in the leading edge of metal framed sliding doors.

Another three point lock, for side hung doors, is the subject of our published European Patent Application No. 0021820. This lock has a complicated and hence expensive operating mechanism.

The present invention seeks to overcome the disadvantages of known three point locks, and yet provide a simple and relative cheap lock, which is extremely slim for fitting into narrow door frame members, and which has a minimum of moving parts.

According to the present invention, we provide a three point lock comprising a casing and, within the casing, a latch integral with a rotary operating member and rotatable through about 90° between a fully withdrawn position and a projecting locking position, two bolts movable in opposite directions for engaging in the head and sill of the door frame on rotation of the rotary operating member to move the latch to its locking position, the latch and the bolts being movable to and from their locking positions by means of a single operating handle, and a locking slide slidably from a release to a locking position to lock the rotary member in its locking position, said locking slide being movable by means of an operating device separate from the handle.

Preferably, the latch is of the hook type traditionally used for sliding doors. Preferably, it incorporates an alumina ceramic insert resistant to hacksaw attack.

Preferably, each bolt is connected to the rotary member by means of a link, one end of each link being pivotally connected to the non-operative end of the respective bolt, and the opposite end of each link being pivotally connected to the rotary member, the two pivot points on the rotary member being radially spaced from the centre of the rotary member and diametrically opposite each other.

Preferably, the locking slide is slidable in the same directions as the locking bolts, and is located to one side of the rotary member, and slides in a plane parallel to but spaced from the rotary plane of the said member. Preferably, the slide is guided by two pins extending between the front and rear walls of the casing, each of which has a shoulder thereon for locating the slide, the pins engaging in a slot or slideway in the slide.

Preferably, said pins are located, one above and the other below the rotational axis of the rotary member.

Preferably, a spring biases the locking slide into its dead-locking and unlocked positions. This spring may be a kinked leaf spring supported on the slide, the apex of the kink being located on one side or the other of one of said guide pins, dependent on the position of the slide.

Preferably, the three point lock is deadlocked by means of a pin engaging in a slot. Preferably, the slot is located in the slide, and the pin projects from one face of the rotary member, and is radially spaced from the rotational axis of said member by an amount approximately equal to the radial distance of the pivot points for said links from the rotational axis.

Preferably, an aperture is provided in said slide to accommodate movement of the pin engageable in the slot in the slide on rotation of the rotary member when the slide is in its release position, the slot in the slide extending into the slide from a wall of said aperture.

Preferably, the operating device includes a cylindrical member having a radially projecting cam thereon, engageable with one end of the locking slide. Preferably, an end of the slide is bent over through 90° and the cam acts on opposite sides of said bent over end to move the slide to its deadlocking and release position, respectively. The operating device may be a key-operated cylinder, the key being insertable from one or both sides. If desired, a thumb knob or handle may be provided on the side.

A three point lock in accordance with the present invention is now described by way of example with reference to the accompanying drawings, in which:—

Figure 1 is a side elevation of a lock with a side plate removed and showing the mechanism in an unlocked position, and

Figure 2 is a similar view showing the

mechanism in a locking position with a locking slide in a deadlocked position.

Referring to the drawings, the lock is designed to fit in the leading edge of a sliding patio door and must, therefore, necessarily be compact both in width and from its front to its rear. The lock has a casing C which includes two side plates S spaced apart and connected together by means of a plurality of pins P. Located within the casing between the two plates S and mounted for locking movement between the positions shown in Figures 1 and 2 is a rotary operating member or hub 1 to which a hook latch 2 is rigidly connected. Thus, when the lock is in its unlocked position shown in Figure 1 the latch 2 is located totally between the side plates S, but when a handle (not shown) connected to the hub 1 is turning through 90° so the latch 2 is moved to the position shown in Figure 2 in which it can engage with a pin mounted in a frame for the door to which the lock is fitted. A head bolt 7 and sill bolt 8 are mounted within the casing C for sliding movement towards and away from each other in unison with rocking movement of the latch 2. Each of the bolts 7 and 8 is just over a metre long and the top and bottom ends (not shown) of these bolts are guided in apertures in the top and bottom frame members of the door to which the lock is fitted, the bolts moving away from each other when the latch is moved to its Figure 2 position and vice-versa. The bottom end of the head bolt 7 is pivotally connected to one end of a link 3, the opposite end of which is pivotally connected to the hub 1 by a pin 6. Likewise, the top end of the bolt 8 is pivotally connected to one end of a kinked link 4, the other end of which is pivotally connected to the hub 1 by a pin 5. The pins 5 and 6 are arranged diametrically opposite each other on the hub 1.

It will thus be appreciated that after the door has been slid to a closed position, the hub 1 is rotated through 90° so as to engage the hook 2 with the pin in a vertical member of the door frame and the bolts 7 and 8 will move upwardly and downwardly respectively to engage in apertures in the head and sill of the door frame.

In order to deadlock the mechanism in a locking position, a locking slide 10 is slidably mounted within the casing C. The slide 10 is arranged to one side of the hub 1 and links 3 and 4 and has a pair of co-linear slideways therein which engage with respective ones of the pins P to guide the slide for sliding movement in the same direction as movement of the bolts 7 and 8. A leaf spring 23 having an angular portion 24 is supported on the slide 10, the apex of the angular portion 24 being arranged to co-operate with the adjacent pin P so as to bias the locking slide to its unlocked position shown in Figure 1 or, alternatively, to its locking position shown in Figure 2.

The locking slide 10 has a flat 25 at its lower end extending at right angles to the remainder of the slide and which is engageable by means of a cam 26 projecting radially from a lock cylinder 9.

The lock cylinder may be key-operated from both sides or from one side only, the other side having an operating knob or handle connected to it, or other alternative known arrangements may be provided. The cylinder is, however, so constructed that by rotating the cylinder clockwise as shown in Figure 1 to the position shown in Figure 1, the cam 26 will engage the flat 25 to move the locking slide 10 to its unlocked position as shown in Figure 1. In order to deadlock the lock, the cylinder must be rotated anti-clockwise through about 270° so that the cam 26 will move into engagement with the underside of the flat 25, thus moving the locking slide 10 upwardly against the bias of the spring 23 over the dead-centre position of the angular portion 24 until it snaps into the locking position shown in Figure 2 with the aid of the spring 23. Deadlocking is achieved by means of the pin 5 being engaged in a longitudinal slot 27 in the slide 10 which opens into an enlarged aperture 28 in the slide 10 suitably designed to allow the pin 5 to rock between its two extreme positions when the slide is in its unlocked position. When in the locking position it will of course be appreciated that there is no question of a spring force maintaining the locking slide in its locking position and preventing forcing of the hook latch 2 to its unlocked position. This can only be moved to its unlocked position by rotating the hook latch, which is of course resisted by the pin 5 engaging in the slot 27. Hence, deadlocking at all three points is achieved.

The hook latch itself is preferably formed of three steel laminates, the centre one of which has an aperture therein to receive an alumina ceramic insert 11 resistant to hacksaw attack.

The above-described three point lock is extremely compact and has very few moving parts, hence requiring little or no maintenance and being relatively cheap to manufacture and simple to install.

Although the lock has been specifically designed for sliding patio doors, it could of course be used for other types of sliding door or window. Furthermore, by modifying the latch 2 it could be used for certain types of side hung door.

Also, although the locking slide 10 preferably has a slot 27 engaging with the pin 5 for deadlocking, a different arrangement could be provided to prevent rotation of the hub 1. It is preferred, however, that the arrangement is such that if an attempt is made to force the lock, resultant forces on the locking slide will be in a direction other than the two directions of sliding movement of the slide.

As can be seen from the drawing, the lock mechanism is extremely slim from its front leading edge to its rear edge, the maximum width of the mechanism from the front to the rear being dictated by the overall dimensions of the operating member or hub 1. In other words, none of the other moving parts of the mechanism project forwardly or rearwardly beyond the hub 1, which means that the mechanism is sufficiently

slim to be incorporated in even the slimmest of sliding door frame members.

Claims (Filed on 26 April 1982)

1. A three point lock for a sliding door or window, said lock comprising a casing and, within the casing, a hook latch movable with a rotary operating member and rotatable through about 90° between a fully withdrawn position wholly within the casing and a projecting locking position, two bolts movable in opposite directions for engaging in the head and sill for the door frame on rotation of the rotary operating member to move the hook latch to its projecting locking position, and vice versa, the hook latch and the bolts being movable to and from their locking positions by means of a single operating handle, and a locking slide slidable from a release to a locking position to lock the rotary member in its locking position, said locking slide being movable by means of an operating device separate from the handle.
2. A lock according to claim 1 wherein the latch incorporates an alumina ceramic insert resistant to hacksaw attack.
3. A lock according to claim 1 or 2 wherein each bolt is connected to the rotary member by means of a link, one end of each link being pivotally connected to the non-operative end of the respective bolt, and the opposite end of each link being pivotally connected to the rotary member, the two pivot points on the rotary member being equally radially spaced from the centre of the rotary member and diametrically opposite each other.
4. A lock according to any one of claims 1—3 wherein the locking slide is slidable in the same directions as the locking bolts, and is located to one side of the rotary member, and slides in a plane parallel to but spaced from the rotary plane of the said member.
5. A lock according to claim 4 wherein the slide is guided by two pins extending between the front and rear walls of the casing, each of which has a shoulder thereon for locating the slide, and engages in a slot in the slide.
6. A lock according to claim 5 wherein said

pins are located, one above and the other below the rotational axis of the rotary member.

7. A lock according to any one of the preceding claims wherein a spring biases the locking slide into its dead-locking and unlocked positions.
8. A lock according to claim 7 wherein the spring is a kinked leaf spring supported on the slide, the apex of the kink being located on one side or the other of one of said guide pins, dependent on the position of the slide.
9. A lock according to any one of the preceding claims which is deadlocked by means of a pin engaging in a slot.
10. A lock according to claim 9 wherein the slot is located in the slide, and the pin projects from one face of the rotary member, and is radially spaced from the rotational axis of said member by an amount at least substantially equal to the radial distance of the pivot points for said links from the rotational axis.
11. A lock according to claim 10 wherein the pin comprises one of said pivot points.
12. A lock according to claim 10 or 11 wherein an aperture is provided in said slide to accommodate movement of the pin engageable in the slot in the slide on rotation of the rotary member when the slide is in its release position, the slot in the slide extending into the slide from a wall of said aperture.
13. A lock according to any one of the preceding claims wherein the operating device includes a cylindrical member having a radially projecting cam thereon, engageable with one end of the locking slide.
14. A lock according to claim 13 wherein an end of the slide is bent over through 90° and the cam acts on opposite sides of said bent over end to move the slide to its deadlocking and release position, respectively.
15. A lock according to any one of the preceding claims wherein the maximum dimension from front to back of the mechanism of the lock is dictated by the dimension of the operating member or hub.
16. A three point lock for a sliding door or window substantially as hereinbefore described with reference to the accompanying drawings.

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